

IN THE CLAIMS:

The following is a listing of the claims.

1. (Currently Amended): A method for routing, ~~comprising:~~
~~obtaining~~ a packet using a routing table that is cross-linked with a state table that is indexed with an address resolution table index, the packet having an Internet Protocol destination address and a media access control destination address in a data structure[[]], the method comprising:
determining whether a media access control destination address for the packet matches an interface of the packet;
determining whether the packet contains a routable protocol responsive to the media access control destination address matching the interface;
if the packet contains the routable protocol,
checking for layer-level validity of the packet;
marking the data structure associated with the packet to indicate the layer-level validity was checked;
checking for Internet Protocol options being supported and valid; and
marking the data structure associated with the packet to indicate the Internet Protocol options were checked for support and validity; and
if the layer-level is valid and the Internet Protocol options are supported and valid,
accessing the Internet Protocol destination address from the packet;
looking for the Internet Protocol destination address in the routing table;
obtaining an address resolution table index stored in association with the Internet Protocol destination address in the routing table responsive to the Internet Protocol destination address being found in the routing table, wherein the address resolution table index obtained is an index into the state table for locating an entry in the state table; and
storing in the data structure associated with the packet the address resolution table index obtained.

2. (Original): The method, according to claim 1, wherein the interface is an incoming interface.
3. (Original): The method, according to claim 1, wherein the interface is an outgoing interface.
4. (Original): The method, according to claim 1, wherein the routable protocol is an Internet Protocol, and wherein the Internet Protocol is version four.
5. (Original): The method, according to claim 1, wherein the routable protocol is an Internet Protocol, and wherein the Internet Protocol is version six.
6. (Original): The method, according to claim 1, further comprising: determining whether routing is supported within a network processing unit.
7. (Currently Amended): The method, according to claim 1, wherein the ~~data structure is apportioned for~~ address resolution table index obtained is stored in a plurality of canonical frame headers.
8. (Original): The method, according to claim 7, wherein the address resolution table index is stored in a canonical frame header of the plurality of canonical frame headers.
9. (Currently Amended): The method, according to claim 1, wherein the routing table is [[substantially]] more compact than a general routing table.
10. (Original): The method, according to claim 1, wherein the look up is done by finding an exact match in the routing table of the Internet Protocol destination address.
11. (Currently Amended): A method for routing, ~~comprising:~~
obtaining a packet using a routing table that is cross-linked with a state table that is indexed with an address resolution table index, the packet having an Internet Protocol source address, an Internet Protocol destination address and a media access control destination address in a data structure[[:]], the method comprising:

determining whether the media access control destination address for the packet matches an interface of the packet;

determining whether the packet is a multicast packet and whether multicast routing is invoked responsive to the media access control destination address not matching the interface;

if the packet is a packet for multicasting and multicasting is invoked,

accessing the Internet Protocol source address from the packet; and

checking a routing table for the Internet Protocol source address;

if the routing table contains the Internet Protocol source address,

checking for layer-level validity of the packet;

marking a data structure associated with the packet to indicate the layer-level validity was checked;

checking for Internet Protocol options being supported and valid; and

marking the data structure associated with the packet to indicate the Internet Protocol options were checked for support and validity; and

if the layer-level is valid and the Internet Protocol options are supported and valid,

accessing the Internet Protocol destination address from the packet;

looking for the Internet Protocol destination address in the routing table;

obtaining an address resolution table index stored in association with the Internet Protocol destination address in the routing table responsive to the Internet Protocol destination address being found in the routing table, wherein the address resolution table index obtained is an index into the state table for locating an entry in the state table; and

storing in the data structure associated with the packet the address resolution table index obtained.

12. (Currently Amended): The method, according to claim ~~[[12]]~~ 11, wherein the ~~data structure is apportioned for~~ address resolution table index obtained is stored in a plurality of canonical frame headers.

13. (Currently Amended): The method, according to claim [[12]] 11, wherein the routing table is substantially more compact than a general routing table.

14. (Currently Amended): The method, according to claim [[12]] 11, wherein the look up is done by finding an exact match in the routing table to the destination address.

15. (Currently Amended): A method for bridging, ~~comprising:~~
obtaining a packet using an address resolution table that is cross-linked with a state table that is indexed with an address resolution table index, the packet having a media access control destination address in a data structure[[:]], said method comprising:

determining whether the media access control destination address for the packet matches an interface of the packet;

determining whether the packet is a multicast packet and whether multicast routing is invoked responsive to the media access control address not matching the interface; and

if the packet is not a packet for multicasting or multicasting is not invoked,

looking for the media access control destination address in an address resolution table;

obtaining an address resolution table index stored in association with the media access control destination address in the address resolution table responsive to the media access control destination address being found in the address resolution table, wherein the address resolution table index obtained is an index into the state table for locating an entry in the state table; and

storing in the data structure associated with the packet the address resolution table index obtained.

16. (Currently Amended): The method, according to claim [[16]] 15, wherein the data structure is apportioned for having a canonical frame header, wherein the address resolution table index is stored in the canonical frame header.

17. (Currently Amended): The method, according to claim [[16]] 15, further comprising checking whether the bridging is supported within a network processing unit.

18. (Currently Amended): A ~~signal-bearing computer-readable storage~~ medium containing a program which, when executed by a processor, causes execution of a method for routing comprising:

~~obtaining a packet using a routing table that is cross-linked with a state table that is indexed with an address resolution table index~~, the packet having an Internet Protocol destination address and a media access control destination address in a data structure[[]], said method comprising:

determining whether a media access control destination address for the packet matches an interface of the packet;

determining whether the packet contains a routable protocol responsive to the media access control destination address matching the interface;

if the packet contains the routable protocol,

checking for layer-level validity of the packet;

marking the data structure associated with the packet to indicate the layer-level validity was checked;

checking for Internet Protocol options being supported and valid; and

marking the data structure associated with the packet to indicate the Internet Protocol options were checked for support and validity; and

if the layer-level is valid and the Internet Protocol options are supported and valid,

accessing the Internet Protocol destination address from the packet;

looking for the Internet Protocol destination address in the routing table;

obtaining an address resolution table index stored in association with the Internet Protocol destination address in the routing table responsive to the Internet Protocol destination address being found in the routing table, wherein the address resolution table index obtained is an index into the state table for locating an entry in the state table; and

storing in the data structure associated with the packet the address resolution table index obtained.

19. (Currently Amended): A ~~signal-bearing computer-readable storage~~ medium containing a program which, when executed by a processor, causes execution of a method for routing comprising:

~~obtaining a packet using a routing table that is cross-linked with a state table that is indexed with an address resolution table index~~, the packet having an Internet Protocol source address, an Internet Protocol destination address and a media access control destination address in a data structure~~[[;]]~~, said method comprising:

determining whether the media access control destination address for the packet matches an interface of the packet;

determining whether the packet is a multicast packet and whether multicast routing is invoked responsive to the media access control destination address not matching the interface;

if the packet is a packet for multicasting and multicasting is invoked,

accessing the Internet Protocol source address from the packet; and

checking a routing table for the Internet Protocol source address;

if the routing table contains the Internet Protocol source address,

checking for layer-level validity of the packet;

marking a data structure associated with the packet to indicate the layer-level validity was checked;

checking for Internet Protocol options being supported and valid; and

marking the data structure associated with the packet to indicate the

Internet Protocol options were checked for support and validity; and

if the layer-level is valid and the Internet Protocol options are supported and valid,

accessing the Internet Protocol destination address from the packet;

looking for the Internet Protocol destination address in the routing table;

obtaining an address resolution table index stored in association with the Internet Protocol destination address in the routing table responsive to the Internet Protocol destination address being found in the routing table, wherein the address resolution table index obtained is an index into the state table for locating an entry in the state table; and

storing in the data structure associated with the packet the address resolution table index obtained.

20. (Currently Amended): A ~~signal-bearing computer-readable storage medium~~ containing a program which, when executed by a processor, causes execution of a method for bridging ~~comprising~~:

~~obtaining a packet using an address resolution table that is cross-linked with a state table that is indexed with an address resolution table index, the packet having a media access control destination address in a data structure[[]], said method comprising:~~

~~determining whether the media access control destination address for the packet matches an interface of the packet;~~

~~determining whether the packet is a multicast packet and whether multicast routing is invoked responsive to the media access control address not matching the interface; and~~

~~if the packet is not a packet for multicasting or multicasting is not invoked,~~

~~looking for the media access control destination address in an address resolution table;~~

~~obtaining an address resolution table index stored in association with the media access control destination address in the address resolution table responsive to the media access control destination address being found in the address resolution table, wherein the address resolution table index obtained is an index into the state table for locating an entry in the state table; and~~

~~storing in the data structure associated with the packet the address resolution table index obtained.~~

21. (Currently Amended): An apparatus for routing, ~~comprising~~:

~~means for obtaining a packet using a routing table that is cross-linked with a state table that is indexed with an address resolution table index, the packet having an Internet Protocol destination address and a media access control destination address in a data structure[[]], said apparatus comprising:~~

means for determining whether a media access control destination address for the packet matches an interface of the packet;

means for determining whether the packet contains a routable protocol responsive to the media access control destination address matching the interface;

responsive to the packet contains the routable protocol,

means for checking for layer-level validity of the packet;

means for marking the data structure associated with the packet to indicate the layer-level validity was checked;

means for checking for Internet Protocol options being supported and valid; and

means for marking the data structure associated with the packet to indicate the Internet Protocol options were checked for support and validity; and

responsive to the layer-level is valid and the Internet Protocol options are supported and valid,

means for accessing the Internet Protocol destination address from the packet;

means for looking for the Internet Protocol destination address in the routing table;

means for obtaining an address resolution table index stored in association with the Internet Protocol destination address in the routing table responsive to the Internet Protocol destination address being found in the routing table, wherein the address resolution table index obtained is an index into the state table for locating an entry in the state table; and

means for storing in the data structure associated with the packet the address resolution table index obtained.

22. (Currently Amended): An apparatus for routing, ~~comprising:~~

~~means for obtaining~~ a packet using a routing table that is cross-linked with a state table that is indexed with an address resolution table index, the packet having an Internet Protocol source address, an Internet Protocol destination address and a media access control destination address in a data structure[[:]], said apparatus comprising:

means for determining whether the media access control destination address for the packet matches an interface of the packet;

means for determining whether the packet is a multicast packet and whether multicast routing is invoked responsive to the media access control destination address not matching the interface;

responsive to the packet is a packet for multicasting and multicasting is invoked,

means for accessing the Internet Protocol source address from the packet; and

means for checking a routing table for the Internet Protocol source address;

responsive to the routing table contains the Internet Protocol source address,

means for checking for layer-level validity of the packet;

means for marking a data structure associated with the packet to indicate the layer-level validity was checked;

means for checking for Internet Protocol options being supported and valid; and

means for marking the data structure associated with the packet to indicate the Internet Protocol options were checked for support and validity; and

responsive to the layer-level is valid and the Internet Protocol options are supported and valid,

means for accessing the Internet Protocol destination address from the packet;

means for looking for the Internet Protocol destination address in the routing table;

means for obtaining an address resolution table index stored in association with the Internet Protocol destination address in the routing table responsive to the Internet Protocol destination address being found in the routing table, wherein the address resolution table index obtained is an index into the state table for locating an entry in the state table; and

means for storing in the data structure associated with the packet the address resolution table index obtained.

23. (Currently Amended): An apparatus for bridging, ~~comprising:~~
~~means for obtaining a packet using an address resolution table that is cross-~~
~~linked with a state table that is indexed with an address resolution table index, the~~
~~packet having a media access control destination address in a data structure[[:]], said~~
~~apparatus comprising:~~
- means for determining whether the media access control destination address for the packet matches an interface of the packet;
 - means for determining whether the packet is a multicast packet and whether multicast routing is invoked responsive to the media access control address not matching the interface; and
 - responsive to the packet is not a packet for multicasting or multicasting is not invoked,
 - means for looking for the media access control destination address in an address resolution table;
 - means for obtaining an address resolution table index stored in association with the media access control destination address in the address resolution table responsive to the media access control destination address being found in the address resolution table, wherein the address resolution table index obtained is an index into the state table for locating an entry in the state table; and
 - means for storing in the data structure associated with the packet the address resolution table index obtained.
24. (Currently Amended): A method for routing using a state table that is indexed with an address resolution table index, comprising:
- obtaining a packet for network address translation, the packet having a media access control header;
 - determining if a network processing unit is in a pass-through mode responsive for the packet; and
 - responsive to the network processing unit not being in the pass-through mode,
 - obtaining a media access control source address from the media access control header is stored in an address resolution table;

determining whether an incoming interface is running network address translation; and

routing the packet responsive to the incoming interface not running the network address translation, the routing including,

obtaining an address resolution table index from the packet to ~~access and accessing~~ routing information stored in a data structure the state table using the address resolution table index as an index into the state table.

25. (Original): The method, according to claim 24, wherein the pass-through mode is a firewall only mode.

26. (Original): The method, according to claim 24, further comprising:
determining whether the packet is for a multicast or broadcast frame;
determining whether the incoming interface equals an outgoing interface; and
reading control bits for the packet responsive to the media access control source address obtained.

27. (Original): The method, according to claim 26, further comprising:
determining protocol type of the packet; and
determining whether the protocol type is supported on the outgoing interface.

28. (Original): The method, according to claim 27, further comprising determining whether broadcasting or multicasting is invoked for the outgoing interface.

29. (Currently Amended): An apparatus for routing using a state table that is indexed with an address resolution table index, comprising:

means for obtaining a packet for network address translation, the packet having a media access control header;

means for determining if a network processing unit is not in a pass-through mode responsive for the packet;

means for obtaining a media access control source address from the media access control header is stored in an address resolution table;

means for reading control bits for the packet responsive to the media access control source address obtained;

means for determining whether an incoming interface is running network address translation; and

means for routing the packet responsive to the incoming interface not running the network address translation, the means for routing including means for obtaining an address resolution table index from the packet ~~to access and accessing~~ routing information stored in ~~a data structure~~ the state table using the address resolution table index as an index into the state table.

30. (Currently Amended): A ~~signal-bearing computer-readable storage~~ medium containing a program which, when executed by a processor, causes execution of a method for routing using a state table that is indexed with an address resolution table index, said method comprising:

obtaining a packet for network address translation, the packet having a media access control header;

determining if a network processing unit is not in a pass-through mode responsive for the packet;

obtaining a media access control source address from the media access control header is stored in an address resolution table;

determining whether an incoming interface is running network address translation; and

routing the packet responsive to the incoming interface not running the network address translation, the routing including obtaining an address resolution table index from the packet ~~to access and accessing~~ routing information stored in ~~a data structure~~ the state table using the address resolution table index as an index into the state table.

31. (Currently Amended): A method for routing a packet, comprising:
checking for layer-2 validity;
checking for layer-3 validity;
marking a header to indicate that the layer-2 validity check was done;
marking the header to indicate that the layer-3 validity check was done;

determining if a frame is for broadcasting or multicasting the packet;
if the frame is for broadcasting or multicasting the packet, determining if a host operating system is to process the packet; [[and]]
forwarding the packet to a host Internet Protocol stack responsive to a determination that the host operating system is to process the packet;
obtaining an address resolution table index that is stored in a first state table in association with a media access control destination address that matches a media access control destination address for the packet;
storing the address resolution table index obtained in a header of the packet; and
locating an entry in a second state table that is cross-linked with the first state table using the address resolution table index obtained as an index into the second state table.

32. (Original): The method, according to claim 31, wherein responsive to a determination that the frame is neither a broadcast frame or a multicast frame, determining whether a media access control destination address for the packet matches an inbound interface address for the packet.

33. (Currently Amended): The method, according to claim 32, wherein responsive to the media access control destination address not matching the inbound interface address:

determining if bridging is supported by network interface circuitry; and
looking up the media access control destination [[address]] address in an address resolution table.

34. (Cancelled)

35. (Original): The method, according to claim 32, further comprising determining whether a protocol of the packet is routable on an inbound interface for the packet.

36. (Original): The method, according to claim 35, further comprising:
determining whether network interface circuitry supports unicast routing;
checking for support for Internet Protocol options for the packet; and

looking up an Internet Protocol destination address for the packet in a routing table.

37. (Original): The method, according to claim 31, wherein responsive to determining the frame is for multicasting but not for processing by the host operating system, determining if Internet Protocol routing is active.

38. (Original): The method, according to claim 37, further comprising determining whether an Internet Protocol source address for the packet is in a routing table.

39. (Original): The method, according to claim 38, further comprising:
determining whether network interface circuitry supports unicast routing;
checking for support for Internet Protocol options for the packet; and
looking up an Internet Protocol destination address for the packet in the routing table.

40-42. (Cancelled)

43. (Currently Amended): A method for routing a packet, comprising:
checking for layer-2 validity;
marking a data structure associated with the packet to indicate the checking of the layer-2 validity;
determining whether a media access control destination address for the packet matches an interface address of the packet;
determining if the packet is for a unicast or a broadcast;
determining if the packet is for a multicast frame;
responsive to the packet being for the multicast frame, determining whether Internet Protocol multicast routing is active;
responsive to the packet being for unicasting or broadcasting or not being for multicasting, determining whether bridging is supported in network interface circuitry;
looking for the media access control address for the packet in an address resolution table; and

storing an address resolution table index responsive to finding the media access control address in the address resolution table, wherein the stored address resolution table index is associated with the media access control address in the address resolution table and is used for locating an entry in a state table that is indexed with an address resolution table index.

44. (Currently Amended): The method, according to claim 43, wherein the address resolution table index is stored in a data structure associated with the packet.

45-46. (Cancelled)